MINOR STUDIES FROM THE PSYCHOLOGICAL LABORATORY OF VASSAR COLLEGE

XX. The Affective Values of Articulate Sounds

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So far as we know, no attempt has ever been made to investigate experimentally the agreeable and disagreeable character of the sounds used in speech. It is obvious that apart from the associative power of words, the sounds which compose them may by their own pleasantness or unpleasantness exert a not inconsiderable influence on their literary value from an aesthetic point of view. Certain passages of poetry or prose are harsh or melodious in effect. It would seem a promising field in experimental aesthetics that is offered by the affective values belonging to articulate sounds.

The present study, of course, does not do more than effect an entrance into this field. The articulate sounds which we selected for study were combinations of an initial vowel and a final consonant. In order to get at the affective value of the sounds themselves, we chose from the syllables thus composed only nonsense syllables: had we used syllables with meaning, obviously the pleasantness or unpleasantness of the meanings would have wholly obscured that belonging to the sounds themselves. Of course we could not hope wholly to eliminate the meaning aspect, any more than is the case with memory experiments where nonsense syllables are used: a nonsense syllable is always likely to suggest something to the observer's mind. The *vowels* which we used were the following; a as in father, a as in fate, a as in hat, aw, e as in get, ee as in feed, i as in hit, i as in write, o as in hot, o as in wrote, oo as in boot, oi as in oil, u as in mud. The *consonants* were: *checks,* the hard labial p, the soft labial b, the hard dental t, the soft dental d, the hard guttural k, the soft guttural g; *breaths,* s, z, f, v, sh, zh, th; the *nasals,* m and n; *trills,* l. The list of syllables was made by combining each vowel as initial sound with each consonant as final sound, and then eliminating all the combinations that had meaning. The syllables thus chosen were pronounced in a fixed order, constant for all the observers, care being taken to use the same pitch and intensity of voice throughout. As the same person served as experimenter during the entire research, the conditions of pitch and timbre of voice were as constant as it is possible to make them. The order was such that the same sounds did not occur in successive syllables. The observer was asked on hearing a syllable to express her judgment as to its pleasantness or unpleasantness by using one of the numbers 1 to 7 in the usual way. The factor of affective contrast was of course present: if a given syllable was immediately preceded by a very pleasant or a very unpleasant one, its affective value would naturally be influenced in the opposite direction. Using a constant order for the syllables tended to make this factor constant for the different observers, but did not eliminate it: to do the latter would require a very long interval between successive syllables, which in turn would involve not only delay but also

variations in the condition of the observers and serious sources of error.

There were fifteen observers, all women, most of them untrained in introspection. Thirteen of them performed the entire experiment twice, at considerable intervals of time, affording an opportunity, as will be seen, for a study of the consistency of judgments made at different times on the same material.

The affective value of each vowel and each consonant was calculated by finding the average of the affective values assigned by all the observers to all the syllables in which the vowel or the consonant occurred. For the thirteen observers who performed the experiment twice, the averages were calculated separately for the first and second trials. The results thus obtained may be stated very briefly.

Vowels. The least agreeable vowel of those investigated is u as in mud, its average affective value for fifteen observers on the first trial being 2.9, mean variation .33; for thirteen observers on the second trial, 2.9, m. v. .34. Next above this stands the sound oi, with an average value of 3.4 on the first trial, m. v. .89; and of 3.3 on the second trial, m. v. .95. The very large mean variations here indicate the fact that the observers were less agreed as to the pleasantness and unpleasantness of this sound than as to that of any of the other vowels. Third came the sounds aw, whose average value on the first trial was 3.6, m. v. .49, and on the second trial 3.5, m. v. .40; o as in hot, whose average value on the first trial was 3.5, m. v. .28, and on the second trial 3.6, m. v. .36; and ee, whose average value on the first trial was 3.5, m. v. .46, and on the second trial 3.6, m. v. .51. Fourth came oo, with an average affective value on the first trial of 3.7, m. v. .4, and on the second trial of 3.5, m. v. .3; and i as in hid, with an average value of 3.6, m. v. .42, on the first trial, and of 3.6, m. v. .47, on the second trial. Tied for fifth place were a as in hat, with an average value of 3.8, m v. .41, on the first trial, and of 3.8, m. v. .33, on the second trial; and i as in write, with an average value of 3.7, m. v. .41, on the first trial, and of 3.9, m. v. .53, on the second trial. Sixth stood a as in fate, whose average value for the first trial was 3.9, m. v. .68, in the second trial 3.9, m. v. .54. The next higher was o as in wrote, with an average value of 4.1, m. v. .32, in the first trial, and of 3.9, m. v. .17, in the second. Next to the highest in affective value was e as in get, whose average value for the first trial was 4.2, m. v. .36, and for the second trial 4.1, m. v. .36. And the most agreeable of all the vowels was a as in father, with an average value of 4.3, m. v. .53, on the first trial, and of 4.3, m. v. .43, on the second trial.

A better indication of the individual affective tendencies than is given by the mean variations of these averages may be found in the following statements. There were six out of the fifteen observers who found the vowel a as in father the pleasantest; five who found the vowel e as in get the pleasantest, three who found the vowel a as in fate the pleasantest, and one each who found o as in wrote and oi the most agreeable. There were eight observers who judged u as in mud the most disagreeable vowel, five who found oi the most disagreeable, two each who judged the most unpleasant vowel to be ee, aw, and a as in fate, and one who judged oo the most disagreeable. The fact that a as in fate and oi were by some observers held to be the most disagreeable and by others the most agreeable vowels is reflected in the large mean variations of their averages.

These averages are computed by averaging the averages of the

various judgments made by each observer on all the syllables containing the vowel in question. Evidently one and the same average furnished by a single observer may represent either a fairly constant judgment on all the syllables with the given vowel, or extreme judgments of an opposite and compensating character: in other words, our averages, while their own mean variations are given, have nothing to show the variations from the averages of which they are composed, and therefore may be very misleading as representatives of the preferences of our observers for different vowels. It seemed best for this reason to calculate the percentages of judgments of a high degree of pleasantness and unpleasantness for each vowel, that is, the percentages of judgments of 6 and 7 on the one hand and of 1 and 2 on the other. The order of diminishing pleasantness, beginning with the vowel which had the highest percentages of 6 and 7 judgments, was as follows: a as in father, e as in get, oo and a as in fate, o as in wrote, oi, i as in write, a as in hat, ee, i as in hit, o as in hot, aw, u as in mud. The order of diminishing unpleasantness, beginning with the vowel which gave the largest percentage of 1 and 2 judgments, was: u as in mud, oi, ee, oo, i as in hit and aw, o as in hot, i as in write, a as in hat, a as in fate, o as in wrote, a as in father and e as in get (same percentage). Oo seems to be a vowel which is the source sometimes of decided pleasantness and sometimes of decided unpleasantness, judging from its high position on both lists; the same is true of oi. I as in write, and a as in hat, on the other hand, are neutral vowels, seldom giving rise to extreme judgments of either sort.

Consonants. The most disagreeable final consonant, according to the averages, is g, average value on the first trials 2.4, m. v. .4; on the second trials, 2.3, m. v. .37. K comes next, its average value being 2.6, m. v. .4, on the first trials, and 2.5, m. v. .38, on the second trials. Next came sh, value 3.2, m. v. .87, on the first trials, and 3.1, m. v. .7, on the second trials; and t, value 3.2, m. v. .4, on the first trials, and 3.1, m. v. .4, on the second. The order of the rest was as follows: zh, first value 3.8, m. v. .79, second value 3.3, m. v. .66; b, first value 3.7, m. v. .4, second value 3.7, m. v. .4; d, first value 3.7, m. v. .5, second value 3.8, m. v. .37; f, first value 3.7, m. v. .48, second value 3.8, m. v. .37; p, first value 3.7, m. v. .39, second value 3.8, m. v. .34; z, first value 3.9, m. v. .67, second value 3.6, m. v. .57; s, first value 3.9, m. v. .5, second value 3.7, m. v. .32; th as in breath, first value 3.9, m. v. .57, second value 3.9, m. v. .51; th as in breathe, first value 4.1, m. v. .6, second value 4.1, m. v. .6; v, first value 4.2, m. v. .56, second value 4.1, m. v. .48; n, first value 4.3, m. v. .5, second value 4.5, m. v. .3; m, first value 4.6, m. v. .48, second value 4.3, m. v. .4; l, first value 4.8, m. v. .5, second value 4.8, m. v. .4.

Checking these results as we did for the vowels, we find that there were ten observers who found l the most agreeable of final consonants, three who found m the most agreeable, three who found n the most agreeable, and one each who preferred th as in breathe, s, and zh to all others. There were nine who thought g the most disagreeable final consonant, three who disliked sh more than any of the others, two each who found k and zh the most unpleasant, and one who disliked t most of all. When the percentages of 6 and 7 judgments and of 1 and 2 judgments were calculated, the order of diminishing pleasantness was as follows: l, m, n, th as in breathe, v, zh, th as in breath, d, z, s, p, sh, f, b, t, k, g. The order of diminishing unpleasantness was: g, k, t, zh, d, p, z, b, s, th as in breath, f, th as

in breathe, v, m, n, l. Zh seems to be a consonant which is sometimes decidedly pleasant and sometimes decidedly unpleasant; s and f are rather neutral, not furnishing a high percentage either of very pleasant or very unpleasant affective values.

A possible source of error in our method lay in the fact that each vowel was not used in combination with all the consonants in turn, for all combinations that had meaning were eliminated. Thus b, for instance, could be used as a final consonant with more vowels than t could, because fewer of its combinations made sense. Now it might happen that a particular vowel could be used only in connection with a group of consonants that happened to be pleasant ones, while the consonants used with another vowel, because they made meaningless combinations with it, might be particularly disagreeable ones. To investigate this influence, the average affective values were calculated of the vowels used with each consonant, and of the consonants used with each vowel. The average value of the consonants used was 3.6 in the case of all the vowels but two; for e as in get it was 3.7, and for aw it was 3.5. The former was therefore slightly helped by the fact that it was used with rather more agreeable consonants, while aw lost a little through the influence of its associated consonants. The effect of the consonants must, however, have been very slight, and by no means enough to account for the positions of these vowels in the series of affective values. The average value of the vowels used was 3.6 for all the consonants except the following: l, p, and v, 3.7; d, 3.5, t, 3.4. Thus l, the most agreeable consonant, was somewhat helped by its vowels, and t would undoubtedly have had a higher place had it been associated with pleasanter vowels. On the whole, however, the fact that the associated letters differed for different vowels and consonants seems to have had no important influence on their affective values.

A curious uniformity is apparent when the mean variations for the first series of trials are compared with those for the second series of trials. There were seventeen consonants used, and in the case of none of these is the mean variation for the second series of trials larger than that for the first series. In the case of fourteen, the second-series mean variation is smaller than the first-series mean variation: in the other three cases both mean variations have the same value. It seems hardly possible that such uniformity can be without significance and due to accident. A possible explanation for it would be to suppose that associations played a greater part in the first set of tests made by each observer, and that as associations differ for different people, there was less agreement among the individual observers in the first series. In the later tests, it may be argued, practice enabled the observers to base their judgments on the affective character of the sounds themselves, regarding which there is, we should have to conclude, a greater degree of unanimity among different persons. The mean variations for the vowels do not show the same tendency. May it perhaps be true that associations are more persistent in their influence on the affective character of vowel sounds? We have not the data on which to base a positive conclusion with regard to this matter.

The Self-Consistency of the Observers. A chapter in experimental aesthetics should deal with the self-agreement of an observer in judging the pleasantness or unpleasantness of given material at different times. Of course the causes of variation are often to be found in conditions such as the physical state of the observer or accidental

reasons for high or low spirits on his part, but other factors might be investigated whose laws could be more easily ascertained. For instance, in using our method, it may be asked what kind of judgments an observer is least likely to change at a second experience: if a syllable has been assigned an extreme affective value, 7 or 1, at the first trial, will this judgment be more or less subject to revision than if it had been assigned a moderate affective value, 3 or 5, or had been a judgment of indifference, 4? Are we more likely to change our minds with regard to our extreme likes and dislikes or with regard to our moderate ones?

To investigate this point, we first counted the number of judgments of each kind (1, 2, 3, 4, 5, 6, and 7) made by each observer, and then, counting the number of these judgments which were unaltered in the second series of experiments made by the corresponding observer, we calculated the percentages. It is essential to note that the observers never reported remembering their previous judgment on a syllable, and the syllables were so numerous that such recollection would not be likely to occur often. The number of judgments of 1 and 7 was so small that the percentages calculated for them are not trustworthy. But the results showed quite plainly that the degree of constancy was greater for the judgments of a slight degree of pleasantness or unpleasantness (3 or 5) than for the judgments of a fairly high degree (2 or 6). It would seem that, under these experimental conditions, when we have asserted a considerable degree of affective reaction to an impression, we are more likely to change our minds at a later trial than when we have asserted only a moderate degree. With regard to the judgment of indifference, 4, the case is somewhat peculiar. Some observers rarely make it, and indeed the *Aufgabe* of the experiment, which demands of the observer an affective reaction, works against the occurrence of this judgment. Observers of this type, who make sparing use of the judgment 4, have a strong tendency to change it on the second trial. On the other hand, if an observer has no hesitation in pronouncing a syllable indifferent on the first trial, she has a strong tendency to make the same judgment at the second trial.

Summary. The most agreeable vowels in combination with a final consonant are a as in father and e as in get; the most disagreeable is u as in mud. The most agreeable final consonants are l and the nasals m and n; the most disagreeable are the gutturals g and k. There is most disagreement among the observers with regard to the affective value of a as in fate, oi, and oo, among the vowels: zh is the consonant with regard to which there is least unanimity. The vowels i as in write, and a as in hat, and the consonants s and f, are neutral, seldom occasioning judgments of extreme pleasantness or unpleasantness. In the case of the consonants, the thirteen observers who were tested twice showed more unanimity in the second trials than in the first ones: a possible explanation would lie in the falling off of associative influences with practice. If this explanation is true, the vowels must preserve their associations longer than the consonants, for no increase in unanimity is observable in their averages between the first and second trials. The observers changed their minds on a second trial less in regard to the moderate judgments 3 and 5 than in regard to the more extreme judgments 2 and 6. Observers who readily used the indifferent judgment 4 tended to abide by it: those who used it sparingly tended to change it at a second trial.